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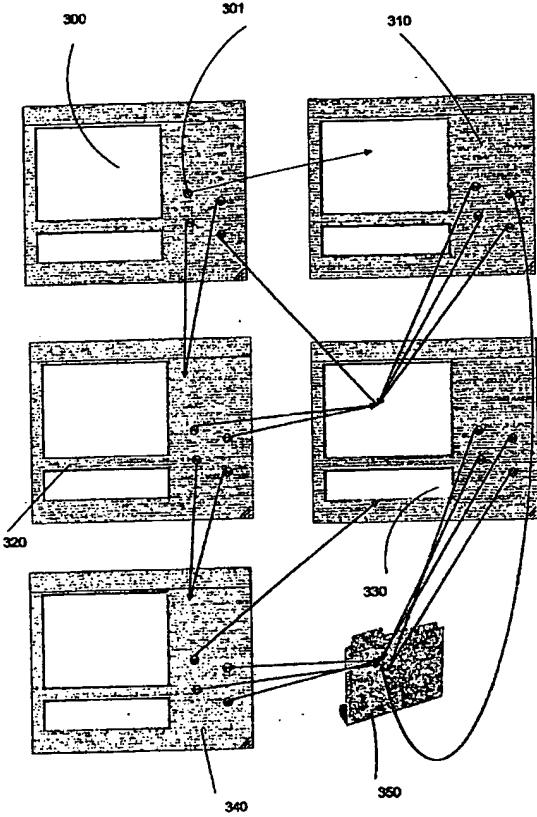
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**(54) Title: COMPUTER IMPLEMENTED PROFILING SYSTEM AND METHOD**

**(57) Abstract:**



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## Computer Implemented Profiling System and Method

### Field of the Invention

The present invention relates to a computer implemented profiling system and

5. method.

### Background to the Invention

Most companies need to research their customer requirements, identify sales opportunities, market their products and services, and make sales.

10. Increasingly, they would like to do this over the Internet or in some other interactive environment (such as interactive television or mobile phones).

A marketing, sales or profiling application must:

- (1) be interesting enough to hold the user's attention;
- (2) go into enough depth to obtain answers required;
- (3) be simple to implement and update; and,
- (4) be flexible enough to handle different requirements.

However, this is not straightforward as requirements (1) and (2) typically

20. conflict as do requirements (3) and (4).

Profiling techniques such as questionnaires are straightforward to implement but either require answers in a natural language form, which users often find boring and time consuming and require interpretation by the company, or

25. multiple choice, which are less flexible in capturing a user's answer and require significantly more questions than free-form answer questions to obtain detailed data but provide data that is easier to process.

Many services require customers or potential customers to fill in forms which

30. define their requirements or provide other information to the service provider.

This process may:

- deter customers due to the length of time involved in the process

- be limited by the fixed structure of the form
- condition the customer to expect a certain result and/or to view any subsequent service or outcome in a particular light
- condition the customer to enter inaccurate or biased data (particularly significant in market research)

5

Given the increased accessibility of the internet and World Wide Web, many profiling techniques have been moved online so that they can be used remotely by a user or applicant. For example, it is now possible to join a 10 dating agency or apply for a job online from your home. There are however disadvantages of this. In the case of the dating agency:

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- registration can involve entering multiple criteria that both describe oneself and the type of person one is looking for. Dozens of questions may need to be answered which may deter the applicant from joining.
- matches presented by the service are viewed as the mechanical result of selection by criteria, rather than having the 'human touch' they would have if introduced by a friend;
- if the form asks the player to choose between describing themselves as 'handsome' or 'ugly', the user is most likely to choose the former, 20 regardless of accuracy.

25

In each case, the user is aware of the expected end result and often skews his or her answers accordingly, giving what he or she hopes to be the correct answer instead of the answer he or she would naturally give without outside influences. As a result, the value of profiling techniques and similar online data capture is reduced.

30

Another problem concerns the different platforms used to access the internet. Whilst a PC may still be considered a platform that can generally access most interfaces, enter text, ticking boxes or do other things is often impractical on systems which use remote controls or keypads.

#### **Statement of Invention**

According to an aspect of the present invention, there is provided a computer implemented profiling system comprising a user interface and a scenario database, the scenario database including a plurality of scenarios and a plurality of actions selectable by a user in response to each respective scenario, the system being operative to present one of the scenarios and one or more of the actions to the user via the user interface in dependence on system state data, wherein upon selection of an action by a user, the system is operative to update the system state data in dependence on the action selected and/or the scenario and to cause a transition within the user interface to present a subsequent scenario or initiate an end state, the or each subsequent scenario and actions presented being determined in dependence on the system state data.

Profiling data is captured in the form of system state data which includes enriched data based on the actions of the users.

Upon initiation of the end state the system may be operative to present results of a database query in dependence on said system state data and/or to write to a database in dependence on said system state data.

Actions are preferably associated with intermediate states and final states, the system being operative upon selection of an action associated with an intermediate state to cause transition to an associated scenario.

The scenario database preferably includes a plurality of modules, each module including one or more associated scenarios, the system being operative upon selection of an action associated with a final state to cause transition to a scenario of another module.

Preferably, upon selection of an action associated with a final state for each of the plurality of modules, the system is arranged to initiate the end state.

The user interface may include a web page or an interactive voice response system (IVR). In the case of IVR, upon initiating a predetermined end state

(such as someone selecting answers compatible to share a flat) the system may be operative to connect the caller to a predetermined number.

- According to another aspect of the present invention, there is provided a  
5 computer implemented profiling method comprising:  
storing a plurality of scenarios and a plurality of actions selectable by a user in  
response to each respective scenario;  
presenting one of the scenarios and one or more of the actions to the user via  
a user interface in dependence on system state data; and,  
10 upon selection of an action by a user, updating the system state data in  
dependence on the action selected and/or the scenario and causing a  
transition within the user interface to present a subsequent scenario or initiate  
an end state, the or each subsequent scenario and actions presented being  
determined in dependence on the system state data.

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Preferred embodiments of the present invention may include:

- use of text graphics and sound and a set of rules derived from psychological profiling and/or other techniques to initiate and present a virtual world to the user and to define therein the role of a character  
20 with which the user is invited to identify him/herself;
- prompting of the user to choose options or input other data consistent with the role that the user has adopted;
- employing the data derived from the user's choices and the internal rule-set to alter the state of the system; and
- 25 • use of psychological profiling and/or other techniques to determine the required information from an analysis of the user's choice of actions.

Embodiments according to the present invention have the following advantages:

- 30
- the user is not always and/or necessarily aware of what information is being gathered
  - the sequence in which information is gathered is more free-form than traditional methods

- the process is intrinsically more interesting to the user than filling in forms
- when used to gather information relating to a service being offered to the user, the system may also be used to condition the user's attitude to the service.

5

Preferably, user responses are executed using a single Action (for example, a single key-press or button push).

10 Due to processing to sequences of selected actions, enriched data can be captured.

Preferably the system is story-based. Although it can call upon rich assets if the delivery system can provide them, it does not require bleeding-edge technology. The system can be accessed or distributed over the Web (using HTML only, or via Flash or other widely accessible Internet platform), on mobile phones, on interactive TV set-top boxes (including the most basic platforms such as Wink), and on PDAs, as well as on PC CD-ROMs. DVD applications are also possible.

20

Content can be altered without changing the underlying technology. As a result, templates and authoring systems for non-programmers are possible.

One embodiment of the present invention related to profiling for online dating.

25 The system involves the user in a fictitious hunt for a blind date. During play, the game monitored choices and built up a profile of the user's ideal partner. At the end of the game, the system deep-links into a database of subscribed members of the dating service and extracts the appropriate matches.

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Scenarios are preferably used to obtain data indirectly in a manner that is transparent to the user to avoid attempts to skew answers. Concepts such as an 'automatic ticket machine' are used to acquire data about locations as well

as other story-based concepts about, for example, toilets to gather gender data.

The use of a game has been found to have a major implication regarding the  
5 user's attitude to the service provided. By associating scenarios with particular aspects of services offered by the service provider and by dramatising the scenarios appropriately, the system can also help to determine the user's future emotional orientation towards those services. For example, in a dating scenario, if the user has enjoyed talking to a fictional suitor, any match that is  
10 then returned by the service provider according to the data query generated by the game will be (both consciously and subconsciously) associated by the user with the game suitor and viewed by the user as an outcome of the enjoyable conversation, rather than an outcome of a clinical form-filling exercise.

15

In a trial, a dating system using an embodiment of the present invention was found to be extremely successful. The system achieves a regular conversion rate of 2.24% - that is, 2.24% of players take out a subscription to the service at the end of the game - over twice the rate of comparable marketing devices.

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#### **Brief Description of the Drawings**

Embodiments of the present invention will now be described in detail, by way of example only, with reference to the accompanying drawings in which:

25

Figures 1 and 1a are screen shots of a user interface generated by a system according to an embodiment of the present invention;

Figure 2 is a schematic diagram of a data structure for use in a system according to an embodiment of the present invention; and,

Figure 3 is a schematic diagram illustrating operation of a system according to an embodiment of the present invention.

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#### **Detailed Description**

Figures 1 and 1a are screen shots of a user interface generated by a system according to an embodiment of the present invention.

- The embodiment relates to an application that profiles an applicant to a dating service with a view to finding a perfect date. Information is collected from interactions within a game in which example scenarios in a role-playing environment are presented to the applicant. Actions made and decisions
- 5      reached within the scenarios not only influence the progress of the game to ensure relevant information is captured but data is also captured transparently to the applicant and is then submitted at the end of the 'game' to an external database where it is matched against available dates.
- 10     An interface 1 is presented to the applicant at a remote terminal. The interface includes a representative image and label 2 to illustrate the presented scenario (in this case, the image shows location in virtual world), icons 3 indicating options available to the user, an option text area 4 that presents detailed information on an option when the users mouse moves over
- 15     the respective icon 3, a text area 5 for displaying text on the current question or situation presented by the scenario to the user, and an image area 6 for displaying characters or other relevant graphical data associated with the current game state.
- 20     Options may correspond to, for example, a question or an action that will determine the state of the game and generate new conditions, questions or other material.
- In this example, multiple choice options are used to change the game state.
- 25     Up to four options are available at any time and these are indicated by the four circular icons 3. If an icon has an option available, it displays an exclamation mark as shown in the image. The user can then display the option text 4 by 'rolling' his mouse pointer over the icon.
- 30     If the user wishes to select an option, he/she simply clicks on the circular icon 3 associated with the displayed option.

Selecting an option 3 changes the state of the game (or, in other words, the composition of the interface 1). The game state is conveyed to the user on

screen by graphics, for example a picture 2 of where you are and/or pictures 6 of relevant characters or objects. The game state is more explicitly defined by output messages 4. Although output messages are shown as text in this case, they could also be/include other mediums such as video or audio data.

5

In Figure 1, the scenario is trying to capture data on the user's attitudes to smoking. The user is having a discussion with a potential date and is offered the possibility of obtaining cigarettes.

- 10 In the case illustrated, the User moves a pointer at will over the circular icons 3. Where a circular icon 3 contains an exclamation mark, there is an associated response which is displayed in the text area 4.

- 15 In this example, the user has moved their mouse pointer over the bottom right circular icon 3, which pulsates to show that it is selectable. At the same time, a response 4 displays at the bottom of the screen: "Don't buy any..."

Optionally, each circular icon 3 can be distinguished using an audio cue.

- 20 In this example, rolling the mouse pointer over the other circles 3 would reveal the responses:

"Don't buy any – if you're desperate, you can scrounge one."

"They've got your favourite brand. Buy a pack."

- 25 Upon selecting the option 'Don't buy any – you don't smoke at all', the interface changes to display Figure 1a.

Although the question identifies whether the user smokes, the user's attitudes to smoking are still not complete as:

- 30 1. People who scrounge cigarettes MAY be more tolerant of other people's attitudes to smoking than people who have a 'favourite' brand.  
2. People who do not smoke MAY not be tolerant of other people's smoking habits.

As is shown in Figure 1a, a new scenario is displayed. Since it has been determined that the user's views on smoking are not yet clear, the system has decided to acquire more information from the User by further developing the Smoking scenario.

5

On this screen, the responses available are:

"Yes, but it really doesn't bother me too much."

"Well I'm not. I avoid smokers like the plague."

"I don't mind it, but I don't think I could kiss a really heavy smoker!"

10

Once the User makes a choice on this screen, the system may determine that sufficient information has been collected and a new element of the scenario is introduced, for example to do with drinking.

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The process now continues, using rules to select scenarios and responses that, together, elicit information about the user's personality, physical appearance, and behavior but at least some of which are selected in dependence on the user's previous responses.

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Once the system has determined that it has acquired sufficient information about the user, it prepares to acquire a set of matching 'dates'. In this embodiment, this is done by transforming the data captured on the user into a database query that is applied to the dating agency's database to return a web page with matches.

25

The User is then transferred to another environment where he/she is invited to subscribe to the service in order to meet these 'ideal dates'.

30

During operation of the game, the user's choices are monitored by the system and used to generate a data set. For example, discussions in the game about marital status may be used to generate a preference for dating married men. Unlike a form, however, the conditions in the game which prompt the user to make a decision can be quite subtle and/or complex. For example, the game may generate several states for the user to respond to before finally

determining by psychometric or other analytical method that the user has a preference for married men.

The analysis leading to the generation of data ('user profile') for the service provider may be carried out using a final or intermediate game state, which is conditional on the total sum of decisions made by the user up to the moment of analysis, as well as on the actual decisions themselves.

In slightly different terms, the system can not only record choices directly (e.g. in a dating context, the player chooses to meet blonde men during the game and this is compiled into a query that will match the user with blonde men), it can also be programmed to analyze the pattern of the user's choices and interpret this pattern to provide emergent data, for example a psychological profile of the user.

This is possible because of the basic principle that user choices not only dictate what data are compiled by the program, but can also change the state of the program itself. Unlike a conventional form, where questions follow each other in a fixed sequence, this enables the program to present choices, dilemmas, questions or other material that are dependent on previous choices either singly or in combination.

When the game concludes, the data generated by the game in response to the user's choices and its analysis of the game state are compiled into a database query or record (or both). For example, in a dating game, this can be used to select possible matches for the player from the dating service database and/or also create a profile for the user in the dating service database that others can see/match against.

- 30 The system preferably includes:
- A collection of items (the 'world database') that may be numeric, textual, visual (eg a picture), or aural (eg music, sound effects) and which are used in conjunction with the rule-set (see below) to generate the virtual world and inter alia the events, characters, locations,

dilemmas and choices which make up that world and the user's role within it;

- A set of rules (the 'rule-set') derived from psychological profiling and/or other techniques that determine the initial state of the system and how it may be changed
- An index of significant states that have been defined prior to execution of the process, using a set of criteria (the 'profile criteria') that may be derived from psychological profiling techniques or other methods.
- A list of achieved significant states (the 'profile data')

10

A general order of operation is as follows:

1. Rules are used to select an initial set of items from the database. These items are presented to the user and together they represent the initial scenario and state of the system. The initial state may vary each time the system is launched, since the rules may determine a partially or wholly randomised selection of items.

2. In dependence on the system state, options to be made available to the user are selected

20

3. The scenario and options are presented and the user's response is captured.

4. The rules are used to determine how the input from the user should be used to alter the state of the system. The new state is stored in the database.

25 5. If the current state matches any of the significant states, it adds this significant state to the list of profile data.

30 6. The rules are then used to select a new set of items from the database. These items are presented to the user and together they represent the current state of the system.

7. The system then loops back to step (2) above. The loop continues until the rules determine that the system has reached a final state, at which point the process terminates.

- 5 The system may execute locally on the user's terminal or remotely or a combination of the two. In the case of the dating agency example of Figure 1, the system constructs a query as a URL – for example:

http://uk.search.personals.com/results/results?searchtype=1&searchsource=1&searchmode=1&r\_gender=1&r\_gender\_pref=2&r\_min\_age=60  
10 &r\_max\_age=99&r\_latitude=527550&r\_longitude=5562&r\_radius=50&r\_marital\_status=1,2,3&r\_marital\_status\_w=1&r\_has\_kids=2,3,4&r\_has\_kids\_w=1&r\_education=4&r\_education\_w=1&r\_employment=4&r\_employment\_w=1&r\_smoking=1&r\_smoking\_w=1&r\_drinking=&r\_interests=3,5,7&r\_interests\_w=1

15

The URL contains parameters which have been generated by the system as a result of analysing the Information. For example, one screen displayed to the user may be a map. When the User clicks on the map to select the nearest location to his or her home, the selection is stored and then the system later 20 uses a set of tables and other information to generate the query parameter:

r\_latitude=527550&r\_longitude=5562

Similarly, in the smoking example of Figure 1 and 1a, the result may be encoded as: smoking=1&r\_smoking\_w=1

25

Figure 2 is a schematic diagram of a data structure for use in a system according to an embodiment of the present invention, and Figure 3 is a schematic diagram illustrating operation of a system according to an embodiment of the present invention.

30

In Figure 2, a data structure suitable for implementing scenarios and actions is illustrated.

The data structure includes a scenario block 100 that is linked to a number of action blocks 130. Text data and/or image data associated with the scenario may be stored in an area 110 of the scenario block 100 or may be stored separately and linked to the scenario block 100. Links to each action block 130 are held in a link block 120.

All action blocks 130 that are possibly accessible from the scenario are linked, although not all action blocks may be accessible at any one time depending on the current system state and prior selections by the user. For example, in the case of the smoking scenario of Figure 1 and 1a, after the user selects an action stating they do not smoke, in the next scenario, even though action blocks 130 associated with smokers may be present, the system will not allow them to be selected.

Each action block 130 includes data 131 on any preconditions for being available for selection, text 132 to be displayed (or sound/movie etc) when selected, data 133 on updates to be made to the system state/user profile on selection and also a link 134 to one or more possible next scenarios (or to end the game) to be displayed after selection.

It will be appreciated that system operation will be dynamic and depend on user selections as to how it progresses, as is shown in Figure 3. In the illustrated example, various scenarios 300, 310, 320, 330, 340 and 350 are available and transition from one to another will depend on user selections of options 401. In this example, all options are always available, although it will be appreciated that this need not be the case. Similarly there may be more than 4 options available for a scenario and, if so, then some order of precedence may need to be predefined. Certain selections may eliminate certain actions from being available whilst other may introduce the possibility of others. The system can be as simple or as complex as needed. In the illustrated example, responses are eventually written to a file store 450. The system need not necessarily provide the user with any feedback - for example in the case of a job application or questionnaire, the data may simply be stored for subsequent access by the respective organisation/company.

Although input has been shown via a mouse, other input types could be possible such as use of natural language (possibly in connection with an artificial intelligence system back-end), use of predetermined keys (such as an up down key on a mobile phone) or the like.

The system could be built using a modular structure. Each topic area (e.g. 'marital status' in a dating game) that the service provider wishes to generate profile data for is embedded into its own 'scenario': a story, setting or other dramatised context, for example, a discussion with a man regarding the virtues of remaining single. Different scenarios and topic areas can be included or excluded from the currently compiled version of the game. This has the effect of increasing or decreasing the length of the game cycle and altering the data-set generated by the game.

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The User could be the user of a telephone and the Scenarios and Responses could consist of the spoken word. The Responses would associate themselves with a number from 0-9 and the User would select and Execute a Response by pressing the appropriate number.

20

Applications for the above could include the filtering of applicants for jobs, flat-shares, and dating services. In the case of flat shares and the like, a system could be implemented in which enquiry calls are intercepted by an IVR system and only those entering responses to scenarios that have been set in advance as being acceptable are put through to the actual contact.

Scenarios and actions/responses can be generated using a natural language rule-set operating in conjunction with a database of assets. For example, in the Dating application, the names of the women you meet can be changed to reflect the names of real people. The scenarios can then be built using the profiles of those real people, so that the program will effectively 'introduce' the User to real people within an imaginary scenario.

The User can be required to define an avatar that will represent the User within the Game, and the User's requirements with respect to the Avatar can also be used to generate Information.

- 5 Note that the Information may need to be processed with the application not just for presentation to the User but for other purposes (eg for presentation to a third-party tester). For example, in a job interview, the User would play the 'game' but the Information would be processed for the benefit of, and presented to, the Interviewer.

10

The Information may (and usually will) be processed twice. This is because the Information on its own may not be intrinsically meaningful. In order to be turned into a profile criterion, the Information will probably be processed in some way. For example, if Response(12)=0 then Kids(2)=0.

15

A whole sequence of Responses would lead to the build-up of Information that together could be processed to produce a single profile criterion. As in the example of Figure 1 and 1a, the system may determine that a sequence of scenarios related to smoking are required in order to determine the User's exact attitude to the habit.

20

The Responses are normally held in a multidimensional array which also indexes scenarios, helping to determine program flow, and holds values that are used to build the Information data. The Rules determine which Responses

25 should be used to build the Information and in what way.

A module may consist of a number of scenes.

- A scene is a combination of text and graphical elements. The exact format  
30 can vary from game to game, but all scenes in a particular game (or possibly module) will have the same form.

The most important things actions can do are:

- modify the game state data

- change graphical display elements
- go to a new scene in the current module
- go to a new module in the current game
- end the current game

5

- The game state is simply a set of numeric variables. The number and names of these variables can vary from game to game, but remains fixed throughout any single game. The state for a game is shared between all of its modules.
- 10 The game model supported is fairly abstract, and it will be appreciated that a game developed within it could ultimately be implemented in a number of different ways on different platforms. A push-button driven environment is one possibility, but the game could equally be deployed using, for example, an interactive voice recognition/response system. Games may be deployed as
- 15 abstract story scripts that interface with one or more implementation modules allowing access to the game via various routes – for example a story script could be accessed via the Web and an IVR system.

**Claims**

1. A computer implemented profiling system comprising a user interface  
5 and a scenario database, the scenario database including a plurality of scenarios and a plurality of actions selectable by a user in response to each respective scenario, the system being operative to present one of the scenarios and one or more of the actions to the user via the user interface in dependence on system state data, wherein upon selection of an action by a  
10 user, the system is operative to update the system state data in dependence on the action selected and/or the scenario and to cause a transition within the user interface to present a subsequent scenario or initiate an end state, the or each subsequent scenario and actions presented being determined in dependence on the system state data.
- 15 2. A system according to claim 1, wherein upon initiation of the end state the system is operative to present results of a database query in dependence on said system state data.
- 20 3. A system according to claim 1 or 2, wherein upon initiation of the end state the system is operative to write to a database in dependence on said system state data.
- 25 4. A system according to any preceding claim, wherein said actions are associated with intermediate states and final states, the system being operative upon selection of an action associated with an intermediate state to cause transition to an associated scenario.
- 30 5. A system according to claim 4, wherein the scenario database includes a plurality of modules, each module including one or more associated scenarios, the system being operative upon selection of an action associated with a final state to cause transition to a scenario of another module.

6. A system according to claim 5, wherein upon selection of an action associated with a final state for each of the plurality of modules, the system is arranged to initiate the end state.

5 7. A system according to any preceding claim, wherein the user interface includes a web page.

8. A system according to any preceding claim, wherein the user interface comprises an interactive voice response system.

10 9. A system according to claim 8, wherein upon initiating a predetermined end state the system is operative to connect the caller to a predetermined number.

15 10. A computer implemented profiling method comprising:  
storing a plurality of scenarios and a plurality of actions selectable by a user in response to each respective scenario;  
presenting one of the scenarios and one or more of the actions to the user via a user interface in dependence on system state data; and,  
20 upon selection of an action by a user, updating the system state data in dependence on the action selected and/or the scenario and causing a transition within the user interface to present a subsequent scenario or initiate an end state, the or each subsequent scenario and actions presented being determined in dependence on the system state data.

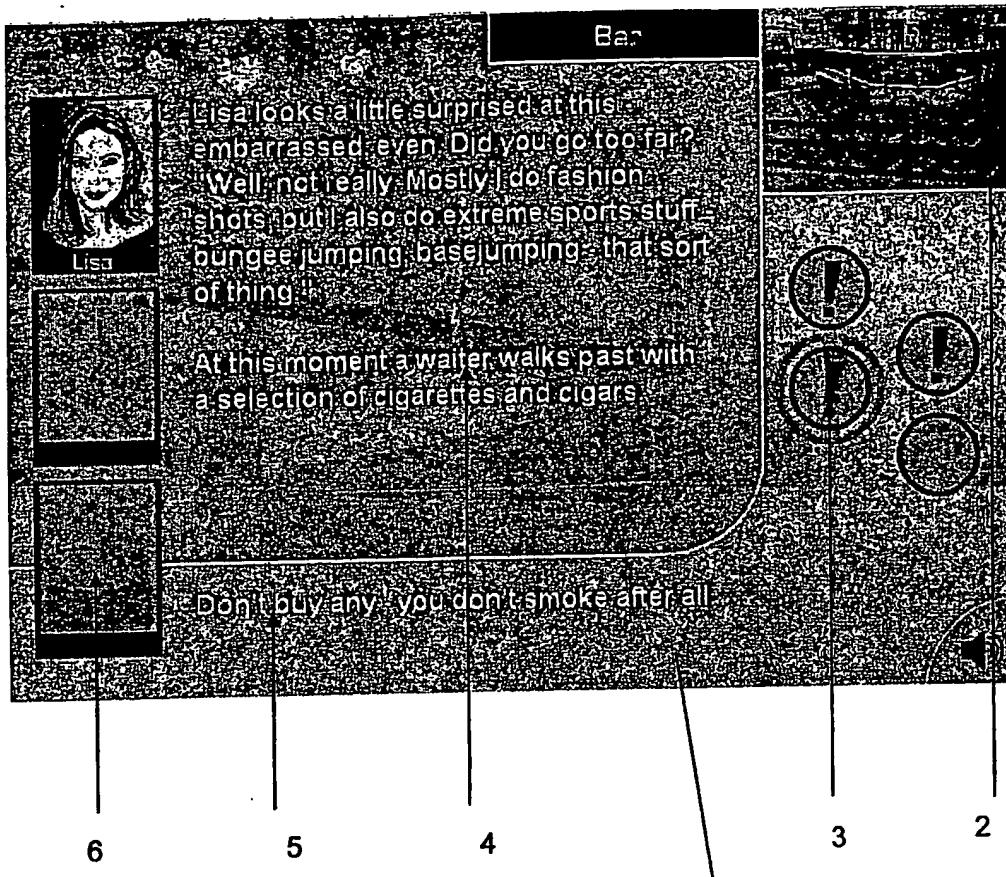


Fig. 1

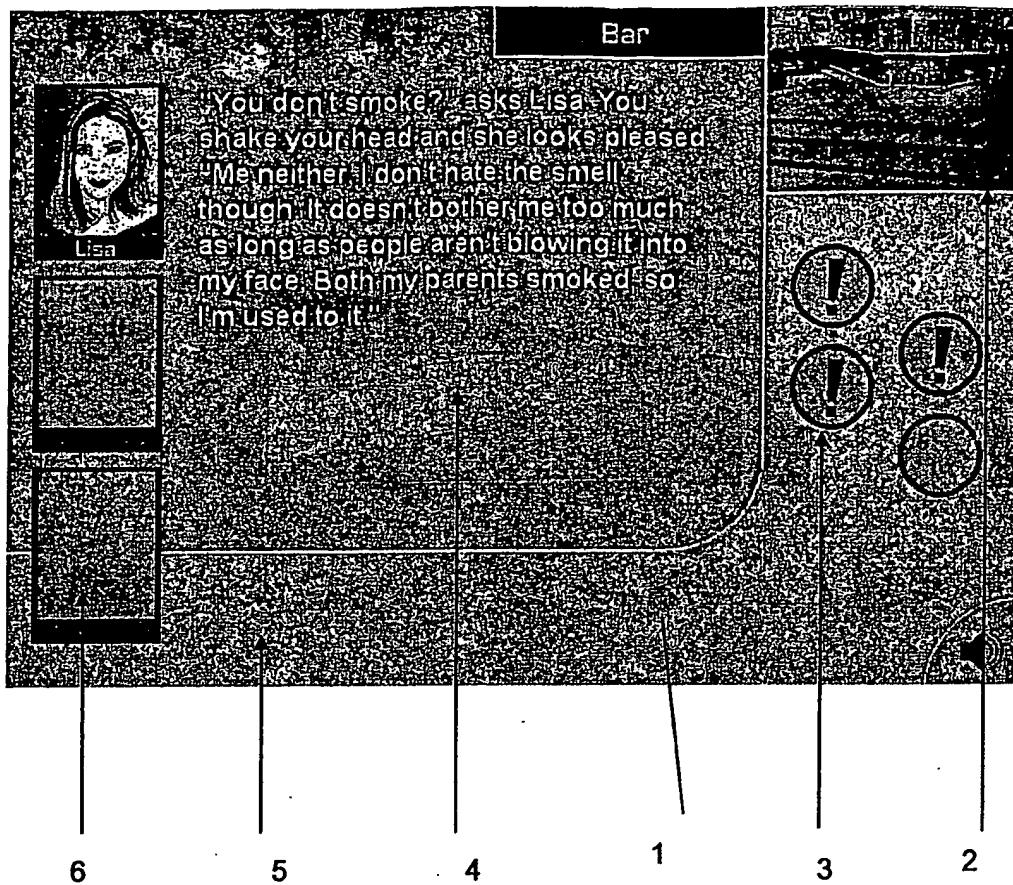
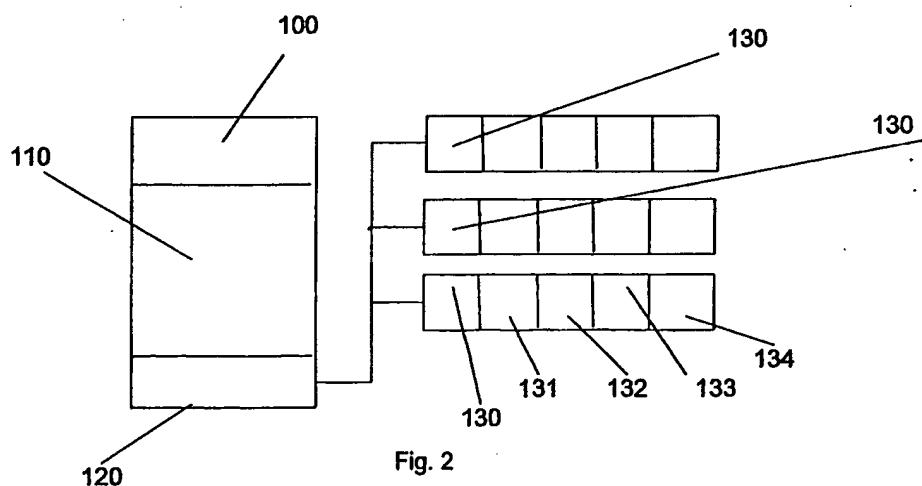


Fig. 1a



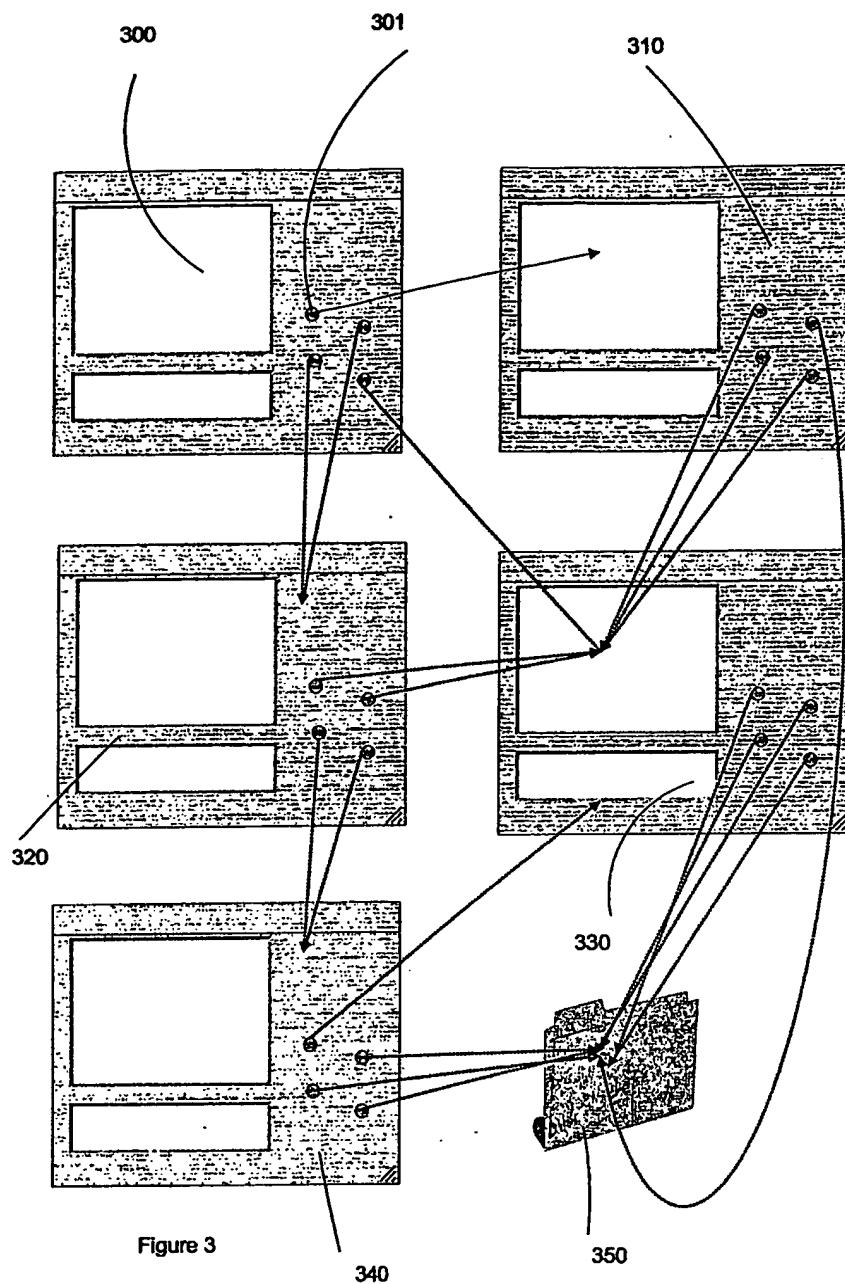


Figure 3

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